Please check applicable box (es):
☒ GOA Groundfish FMP
☐ BSAI Groundfish FMP
☐ Scallop FMP
☐ BSAI Crab FMP
☐ Salmon FMP

HABITAT AREAS OF PARTICULAR CONCERN (HAPC) PROPOSALS

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Title and Brief Statement of Proposal:

Gulf of Alaska Pinnacles and Seamounts

In the rich and productive ecosystem of the Gulf of Alaska, there are 54 documented pinnacles and 19 documented seamounts. Pinnacles and seamounts are rare and exceptional formations that are essential fish habitat rich with the formation of living seafloor such as corals and sponges, and specific fishery mitigation measures are necessary to protect this rare and fragile benthic habitat.

Objectives of Proposal:

(Identification of the habitat and FMP species the HAPC proposal is intended to protect.)

This proposal will protect the living seafloor of the pinnacle and seamount HAPCs of the Gulf of Alaska from impacts from bottom trawls, pelagic trawls that contact the bottom, and other commercial fishing gear that touches the bottom.

There are 54 documented pinnacles and 19 documented seamounts in the Gulf of Alaska region. Pinnacles and seamounts rise up from ocean floor providing habitat for a wide variety of species in a concentrated area.

Corals, sponges, and other living seafloor are habitat that provides nurseries, places to feed, shelter from currents and predators, and spawning areas for many species of marine life including rockfish, Pacific Ocean perch, flatfish, Atka mackerel, golden king crab, shrimp, Pacific cod, pollock, greenling, greenland turbot, and sablefish. Perhaps the oldest animals on the planet, these long-lived corals have evolved in one of the most stable habitats on earth, too deep to be affected by tides and waves or sunlight. Consequently, they are extremely vulnerable to disturbance and are easily destroyed by a variety of fishing gears.

Oceana's Gulf of Alaska Pinnacles and Seamounts HAPC proposal is completely within the designated essential fish habitat areas of the following FMP managed species: Pacific cod, Pacific ocean perch, shortraker rockfish, rougheye rockfish, and yelloweye rockfish.

Statement of purpose and need:

Pinnacles and seamounts provide rich, concentrated, biodiverse ecosystems. However, indiscriminate destructive bottom trawling in delicate living seafloor habitat like corals, sponges, and other living substrates can irreversibly mar this unique environment. As an example, in 1999, a single pass of a bottom trawl removed 21 metric tons of coral and bryozoans from a pinnacle 27 nm offshore of Agattu Island in the Aleutians. With such dire impacts of destructive bottom trawling, it is imperative to protect the HAPC invertebrates on other pinnacles, and on seamounts, from this kind of decimation.

Protection of pinnacles is not unprecedented. In 2000, NOAA Fisheries established the Sitka Pinnacles Marine Reserve in Southeast Alaska. Protection of deep sea corals and sponges was cited as a rationale for the Sitka Pinnacles Marine Reserve and the no-trawl zone in Southeast Alaska (Witherell and Coon 2000). Further, the rationale for closing the Sitka pinnacle to groundfish fishing acknowledged "the pinnacles habitat is fragile, and the concentration of fishes in a relatively small, compact space can lend itself to overfishing of certain species, particularly lingcod, at sensitive life stages" (Federal Register, Vol. 65, No. 218). The Sitka reserve boasts fantastic aggregations of marine life including lingcod, rockfish, corals and sponges, among others.

Additionally, world fisheries have a documented geographic and depth expansion (Pauly et al., 2003). It is important to protect unexploited areas from future expansion to deeper, previously unfishable areas until there is better understanding of deepwater communities (Koslow et al., 2000).

A description of how the proposed HAPC addresses the four considerations set out in the final EFH regulations:

NOAA Fisheries has identified corals and sponges in Alaska as HAPC as indicated in Amendment 55 to the Groundfish FMPs (1998). Additionally, in a letter from Dr. William Hogarth to Mr. Jim Ayers dated September 9, 2002, Dr. Hogarth stated, "Corals, sponges, and other living substrate in waters off Alaska are already classified by NOAA Fisheries as Habitat Areas of Particular Concern deserving of special protection because of their importance as habitat and their vulnerability to human impacts."

1. **Ecological importance: does the habitat perform an important ecological function?**

Pinnacles and seamounts provide an obstacle to water flow that creates upwelling of currents and consequently nutrients. This nutrient rich water flow promotes complex and dense ecosystems on these undersea structures which includes corals and sponges. Deep water corals and sponges provide high quality fish habitat. The vertical structure formed by these coral colonies provides relief on the seafloor, increases habitat complexity, increases niche breadth, and increases biodiversity. Sessile epifauna increase habitat complexity and play an important factor in structuring benthic communities (Bradshaw et al. 2003). Pinnacles and seamounts support a rich diversity of species in a small area and are worthy of special protection.

2. **Sensitivity: the extent to which the habitat is sensitive to human induced environmental degradation**

Areas characterized by low natural disturbance and long lived species are the most sensitive to anthropogenic disturbance (NRC, 2002). Pinnacles and seamounts epitomize the type of habitat that is most sensitive to disturbance and takes the longest to recover, if ever. Deep-water corals are the oldest and slowest growing types of epifauna. Gorgonian coral colonies are long-lived and slow-growing. A colony of *Primnoa resedaeformis* was aged to 112 years in the Gulf of Alaska (Andrews et al. 2002). Larger colonies formed from multiple settlement events may be 500 years old or more (Risk et al, 2000).

Bottom trawling alters the physical structure of the seafloor, reduces habitat complexity, and changes the composition of benthic communities. Bottom trawling removes epifauna, thereby reducing habitat complexity and species diversity of the benthic community (Collie et al. 2000, Kaiser et al. 2000). According to the National Academy of Sciences, if disturbance from trawling exceeds the resiliency threshold, then irrevocable long-term ecological effects will occur. Gravel pavement substrate disturbed by bottom trawling on Georges Bank in the Northeast Atlantic, for example, had significantly less emergent epifauna, shrimp, polychaetes, brittlestars, and small fish than undisturbed sites (Collie et al., 2000). Scavenging organisms tended to dominate communities in areas of high dredging disturbance while long-lived organisms and fragile taxa disappeared (Collie et al. 1997).

Bottom trawling decreases benthic productivity. Trawled areas of the North Sea, off the coast of Ireland, were significantly less productive when compared to untrawled areas of similar habitat type (Jennings et al. 2001). Areas disturbed by mobile fishing gear on Georges Bank had lower levels of benthic production (both biomass and energy) when compared to undisturbed areas (Hermsen et al. 2003).

Research conducted in Alaska confirms research in other regions indicating that bottom trawling gear damages sensitive benthos. When bottom trawling occurs in coral habitat, up to 30% of coral colonies can be removed (Krieger, 1999). During a submersible study in the Gulf of Alaska, it was reported that 50% of the coral had been removed or broken by a single pass of a research bottom trawl (Krieger, 2002). The corals at the site had not recovered seven years later (Krieger, 2002).

In Seguam Pass in the Aleutian Islands, gorgonian corals, which 20 years ago were a major component of the bycatch of the Atka mackerel fishery, steadily declined thereafter (NMFS 2001). This suggests that after years of bottom fishing, there were significantly fewer of these habitat-forming species left to catch. Video observation of some areas in Seguam Pass show completely destroyed coral habitats with only fragments of coral skeletons and rubble on the bottom (Zenger, 1999).

3. Exposure: whether, and to what extent, development activities are, or will be stressing the habitat
In 1999, a single pass of a bottom trawl removed 21 metric tons of coral and bryozoans from a pinnacle 27 nm offshore of Agattu Island in the Aleutians. With such dire impacts of destructive bottom trawling, it is imperative to protect the HAPC invertebrates on other pinnacles, and on seamounts, from this kind of decimation.

4. Rarity: the rarity of the habitat type
Gulf of Alaska benthic habitat is unique and fragile. Presence of hard corals in the genera *Primnoa* is evident from trawl survey data. This red tree coral is patchily distributed in dense aggregations in Southeast Alaska (Bizzarro, 2002), and a similar distribution of dense aggregations likely occurs in the Gulf of Alaska. There are 54 pinnacles and 19 seamounts in the Gulf of Alaska.

Proposed management measures and their specific objectives, if appropriate:

In order to protect exquisite and rare benthic habitat of Gulf of Alaska pinnacles and seamounts, the following measures should be taken:

For pinnacles, there should be no bottom trawling and other commercial bottom contact should be limited.

For seamounts, there should be a moratorium on commercial fishing.

Proposed solutions to achieve these objectives: (*how might the problem be solved?*) Include concepts of methods of measuring progress towards those objectives.

The pinnacles and seamounts of the Gulf of Alaska deserve special protection. Management measures should prohibit bottom trawling within a two mile radius around the charted least depth of known pinnacles. Any other commercial bottom contact should be limited and permitted only upon determination by NOAA Fisheries that the fishery can be conducted without habitat destruction.

For seamounts, as a precautionary measure, there should be a moratorium on commercial fishing in these areas until they can be explored, the benthic habitat mapped, populations of seamount species estimated, and until NOAA Fisheries determines that a fishery can be conducted without habitat destruction.

Consistent with the Council and agency's discussion, this HAPC proposal assumes that currently closed or restricted areas would remain closed or restricted. For example, current management measures to protect Steller sea lions and their habitat would remain in place.

Expected benefits to the FMP species of the proposed HAPC, and supporting information/data:

Oceana's Gulf of Alaska Pinnacles and Seamounts HAPC proposal is completely within the designated essential fish habitat areas of the following FMP managed species: Pacific cod, Pacific ocean perch, shortraker rockfish, rougheye rockfish, and yelloweye rockfish.

The areas described in this proposal are ecologically important for many reasons, including as habitat for commercially exploited groundfish species. Pinnacles and seamounts are home to many species of corals, sponges, and other important living seafloor substrates. Corals provide essential habitat for a variety of marine species including several species of rockfish, king crab, Atka mackerel, shrimp, Pacific cod, walleye pollock, Greenland turbot, greenlings, and other flatfish (Krieger 1999). Rockfish and Atka mackerel are associated with gorgonian coral, hydrocoral and cup corals (Heifetz 2002). Soft corals in the Bering Sea were found to be in close association with gadids (e.g. Pacific Cod and Walleye Pollock), Greenland turbot, greenlings, and other flatfish (Heifetz 2002). Krieger (1993) noted that juvenile Pacific ocean perch exhibit a preference for rugged areas containing cobbleboulder and epifaunal cover and that shortraker rockfish strongly prefer rugged, high-profile habitat interspersed with boulders. Carlson and Straty (1981), Straty (1987), and Pearcy et al. (1989) found that juvenile rockfish exhibit a preference for high-relief habitat. Juvenile and adult *Sebastes sp.* were often found in association with *Primnoa spp.* during underwater video surveys of rockfish habitat in southeast Alaska (Bizzarro, 2002). Corals may be important for growth to maturity for demersal slope rockfish (EFH EIS).

Research from around the world indicates the destruction of living seafloor negatively impacts fish populations. Destruction of bryozoan growths by trawling in Tasman Bay, New Zealand resulted in a marked reduction in numbers of associated juvenile fish (Turner et al. 1999). Predation rate on juvenile Atlantic cod (*Gadus morhua*) increases with decreasing habitat complexity (Walters & Juanes 1993). Case studies in New Zealand and Australia suggested that loss of habitat structure through removal of large epibenthic organisms by fishing had negative effects on associated fish species (Turner et al. 1999). Removal of epifaunal organisms like corals may lead to the degradation of habitat such that it is no longer suitable for associated fish species (Auster et al. 1996).

Protecting habitat areas from fishing impacts has positive effects. In an area of the Irish Sea, for example, an 11 year closure to scallop dredging increased hydroid colonies (Bradshaw et al. 2003). Hydroid colonies increased diversity and abundance of benthic fauna as well as recruitment of juvenile scallops (Bradshaw et al. 2003). A model of trawl closures around locations where trawl "hangs" occurred showed that prohibiting trawling in areas with structural complexity had positive effects on juvenile Atlantic cod (Link & Demerest, 2003).

Identification of the fisheries, sectors, stakeholders and communities to be affected by the establishment of the proposed HAPC (Who benefits from the proposal and who would it harm?) and any information you can provide on socioeconomic costs, including catch data from the proposed area over the last five years:

There are 54 pinnacles recorded in the Gulf of Alaska north of the southeast Alaska trawl closure (Table 1, Pinnacles in the Gulf of Alaska). Pinnacles do not appear to be targeted by bottom trawlers in the Gulf and most pinnacles fall outside of core fishing areas. In 2001, only 4 fishing blocks recorded bottom trawl activity near pinnacles in the Gulf of Alaska. Total ex-vessel value of fish caught by bottom trawl in those blocks was estimated to be $74,000. In 2002, 3 fishing blocks recorded bottom trawl activity near pinnacles with an ex-vessel value of approximately $14,000 caught.

The proposed pinnacle bottom trawl closures would encompass approximately 2,197 km^2. Economic impacts to the bottom trawl fleet from the proposed management measure are minimal as the pinnacle closures fall outside of most of the core fishing area. Further it is likely that NOAA Fisheries will find that other bottom contact fisheries do have habitat damaging impact. Appropriate prohibitions of bottom contact by these other fisheries may result in permissible shifts in location or change of technique but minimal loss of revenue. Further economic assessments may be conducted in the HAPC National Environmental Policy Act process.

The proposed seamount commercial fishing closures would have no economic impact since the seamounts are far offshore and are currently not fished.

Clear geographic delineation for proposed HAPC (example written latitude and longitude reference points and/or delineation on an appropriately scaled NOAA chart):

There are 54 pinnacles (Table 1) and 19 seamounts (Table 2) in the Gulf of Alaska.

Table 1: Pinnacles in the Gulf of Alaska

Location	Latitude N	Longitude W	Charted Least Depth (Fathoms)	Reference to Nearest Shore	Distance from Reference (nm)
GOA	54° 55.0′	157°32.0′	32	Shumagin I.	57
GOA	56° 18.0′	154° 56.0′	7	Tugidak I.	9
GOA	55° 35.0′	154° 27.0′	100	Chirikof I.	39
GOA	56° 40.0′	156° 42.5′	36	Vgaiushak I.	8.5
GOA	56° 22.5′	152° 56.0′	8	Sitkinak I.	62.5
GOA	57° 56.0′	154° 50.0′	8	Kashvik Bay	3.5
GOA	58° 50.0′	151° 44.0′	3	Amatuli I.	8
GOA	58° 54.0′	150° 56.0′	49	Gore Pt.	18
GOA	59° 09.0′	151° 12.0′	2	Kenai Pen.	3.5
GOA	58° 58.0′	153° 16.5′	3	Shaw I.	3.5
GOA	59° 01.5′	153° 16.0′	10	Shaw I.	3
GOA	59° 07.0′	153° 45.0′	5	Shaw I.	6.5
GOA	59° 12.0′	153° 33.0′	3	Augustine I.	7.5
GOA	59° 18.0′	150° 32.0′	38	Nuka I.	4
GOA	59° 28.0′	149° 40.0′	12	Seal Rks	4
GOA	59° 33.5′	149° 49.5′	31	Granite Cape	3
GOA	60° 01.0′	147° 00.0′	27	Montague I.	10
GOA	59° 04.0′	151° 21.0′	11	E Chugach I	4
GOA	59° 08.0′	152° 03.0′	38	Elizabeth I	5
GOA	59° 44.0′	144° 40.0′	7	Kayak I.	5
GOA	59° 50.0′	142° 31.0′	9	Yakataga I.	14
GOA	56° 40.0′	156° 45.0′	23	Ugaiushak I.	7.5
GOA	56° 37.0′	156° 51.0′	22	Sutwik I.	6
GOA	56° 43.0′	156° 55.0′	12	Ugaiushak I.	5
GOA	56° 41.0′	157° 20.0′	4	Kumlik Cape	5
GOA	56° 29.0′	157° 37.0′	19	Nakchamik I.	7
GOA	56° 24.0′	157° 51.0′	19	Nakchamik I.	3
GOA	56° 04.0′	158° 18.0′	12	Seal Cape	3.5
GOA	54° 30.0′	159° 44.0′	39	Shumagin Is.	15
GOA	54° 19.0′	160° 52.0′	6	Shumagin Is.	40
GOA	55° 06.0′	161° 19.0′	16	Wosnesensk I.	5.5
GOA	54° 58.0′	161° 23.0′	17	Poperechnoi I.	8
GOA	54° 55.0′	161° 23.0′	16	Poperchnoi I.	10
GOA	54° 42.0′	161° 35.0′	8	Outerlliask I.	19
GOA	54° 39.0′	161° 51.0′	19	Deer I.	18
GOA	54° 48.0′	162° 41.0′	1	Deer I.	10
GOA	54° 45.0′	162° 51.0′	9	Cape Pankof	9
GOA	54° 37.5′	162° 50.5′	3	Cape Pankof	7
GOA	54° 30.0′	163° 14.0′	8	Cape Pankof	10
GOA	54° 21.0′	163° 10.0′	2	Sanak I.	15
GOA	56°23.0′	157° 32.0′	23	Sutwik I.	9
GOA	55° 23.0′	159° 40.0′	47	Nagai I.	10
GOA	59° 14.0′	151° 58.0′	10	Kenai Pen.	3
GOA	59° 57.0′	152° 28.0′	5	Alaska Mainland	5
GOA	58° 07.0′	149° 04.0′	47	Marmot I.	90
GOA	58° 00.0′	149° 39.0′	65	Marmot I.	72
GOA	57° 44.0′	149° 58.0′	94	Marmot I.	69

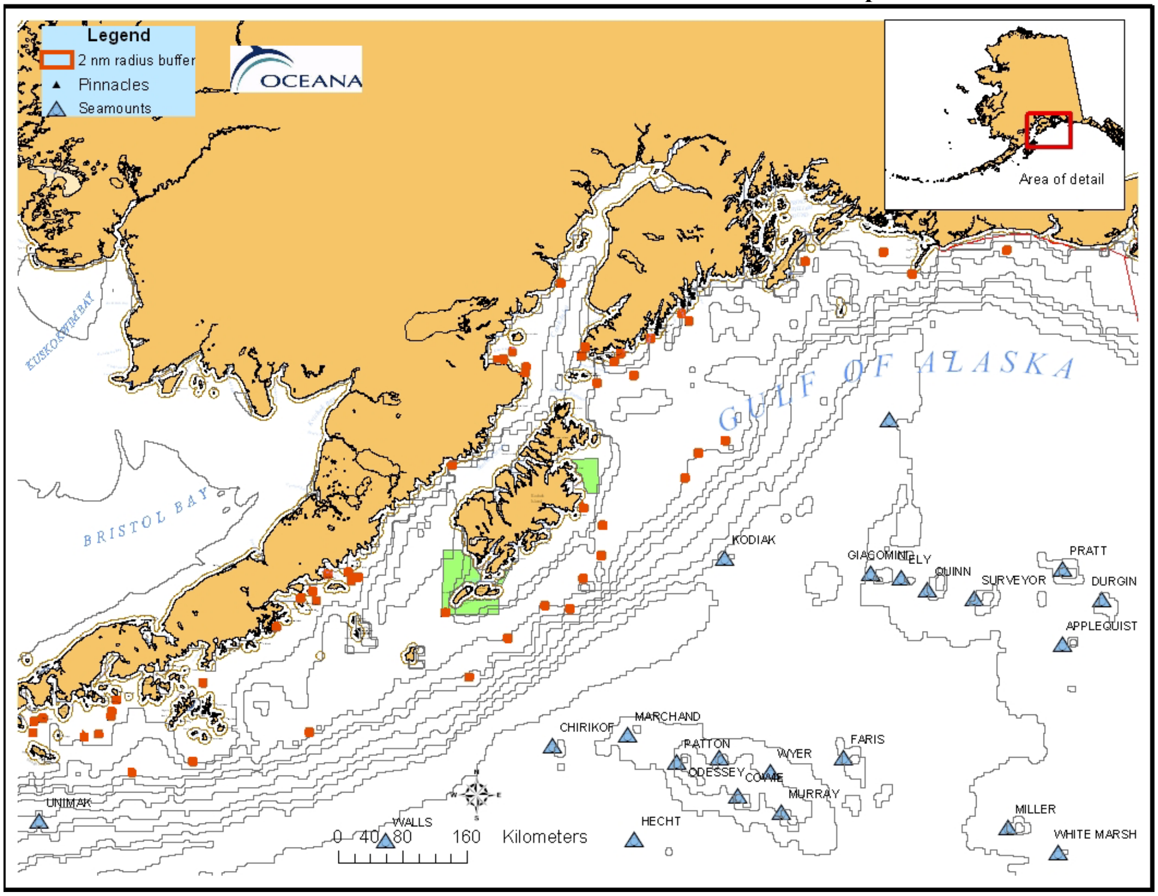
GOA	57° 27.0′	152° 06.0′	10	Narrow Cape	6
GOA	57° 15.0′	151° 43.0′	27	Ugak I.	20
GOA	56° 55.0′	151° 46.0′	28	Ugak I.	32
GOA	56° 40.0′	152° 09.0′	16	Cape Barnabas	37
GOA	56° 20.0′	152° 26.0′	49	Cape Sitkinak I.	50
GOA	56° 01.0′	153° 41.0′	34	Sitkinak I.	32

Table 2: Seamounts in the Gulf of Alaska

NAME	DEPTH (m)	LAT (dec. degrees)	LONG (dec. degrees)
UNIMAK	-1335	53.670	-162.500
DERICKSON	-2890	52.830	-161.250
SIRIUS	-1930	52.000	-160.830
PUTNAM	-3383	51.550	-160.420
STEVENS	-3349	48.150	-158.000
CHIRIKOF	-2561	54.930	-152.830
MARCHAND	-1671	54.924	-151.363
HECHT	-3453	53.750	-151.330
PATTON	-188	54.590	-150.448
ODESSEY	-1657	54.500	-149.750
KODIAK	-2176	56.830	-149.250
WYER	-1968	54.420	-148.670
GIACOMINI	-732	56.500	-146.330
ELY	-2196	56.250	-145.670
DALL	-2579	58.170	-145.580
QUINN	-659	56.250	-145.250
WELKER	-710	55.120	-140.330
BROWN	-1390	55.000	-138.500
DENSON	-927	54.000	-137.250
DICKINS	-476	54.500	-137.000
PIERCE	-1809	53.730	-136.530

Map

Overview of Oceana Gulf of Alaska HAPC Proposal



Map 1: Gulf of Alaska pinnacles and seamounts

<u>Provide best available information and sources of such information to support the objectives for the proposed HAPC. (Citations for common information or copies of uncommon information</u>):

Data Acquisition and Assumptions:
The following section describes the information and process Oceana used to develop proposed HAPC designations and associated management measures.

The precision and accuracy of our analyses is necessarily limited by the precision and accuracy of the underlying information. Our requests to the Fisheries Service for observer data were provided in aggregated 10x10 km blocks. The blocks, or "grids" are referenced by a master gridcode. Blocks displayed in figures in this proposal can be referenced to latitude/longitude coordinates on navigational charts. We used these data to analyze fishing effort and the approximate economic value of fishing areas. Data at this resolution covered approximately 90% of groundfish fishery effort (Ren Narita, AFSC pers. comm.). A necessary assumption for the analysis was that fishing effort was uniform across a given block. For example, a closed area within a block would have an economic impact proportional to the percentage of the block that was closed. As such, an area of 25 km^2 closed to a certain gear type within a 100 km^2 fishing block where $1 million ex-vessel fish value was caught would result in an economic impact of $250,000 of lost revenue. Another assumption is that unobserved vessels fished in the same blocks as observed vessels.

In addition to using observer data, we also incorporated information from the NOAA RACEBASE trawl survey database. Trawl survey end points were plotted as point locations and the catch per unit effort for coral species or species groups was noted. Catch per unit effort in kilograms per square kilometer was calculated by dividing sample weight by area swept. Area swept was calculated as the net width multiplied by trawl distance.

A database of pinnacle locations was obtained from NOAA's Alaska Regional Office. Locations of seamounts were obtained from MCBI's oceanographic data CD-rom (MCBI, 2003).

Methods:
Pinnacles, and seamounts were plotted on the map as point locations and compared to patterns of trawl effort. Fifty four pinnacles and nineteen seamounts were identified in the Gulf of Alaska region.

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